AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended): A non-viral gene delivery vector formed from an aqueous solution of [[A]] a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)

$$[C_6 H_7 O_2 (OH)_{3-a}(OX)_a]_x H_2 O \quad (1)$$

or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)

$$-[CH_2 CH(OH)_{1-b} (OX)_b]_n- \quad (2)$$

$$-[CH_2 CH(OH)_{1-b-c} (OX)_b (OAc)_c]_n- \quad (3),$$

wherein ~~Wherein~~ X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

$-NH_2$ radical,

$-N(CH_3)_2$ radical,

$-N(C_2H_5)_2$ radical,

$-N^+ (C_2H_5)_3$ radical,

$-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2(C_2H_5)N (C_2H_5)_2$ radical,

$-C_6H_4NH_2$ radical, [[and]]

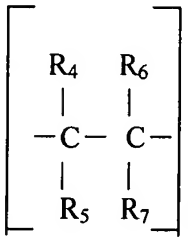
$-COC_6H_4NH_2$ radical,

$-COR_2$ radical where R_2 is $-CH_2NH_2$ or $-C_6H_4NH_2$, and

$-CH_2\ CH(OH)CH_2R_3$ radical [[,]] where R_3 is $-NH_2$, $-N(CH_3)_2$, $-N(C_2H_5)_2$, [[and]] or $-N^+(C_2H_5)_3$ radical,

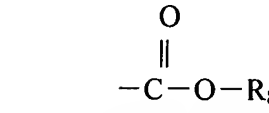
where m is a natural number of 1 to 3, a is a positive number having a value of $0<a<3$, b is a positive number having a value of $0<b<1$, x and n are natural numbers having a value of 5 or more, $1>b+c$, and Ac is acetyl radical; and

a unit derived from a polymerize-able olefin compound of the following formula (4):



(4)

wherein ~~Wherein~~ R_4, R_5 and R_6 are each selected from the group consisting of hydrogen and CH_3, and R_7 is a member of the group consisting of:



~~Where~~ where R_8 is a member of the class consisting of: hydrogen, C_1-C_{12} alkyl radicals, cyclohexyl radical, C_1-C_4 hydroxyalkyl radicals, C_1-C_8 aminoalkyl radicals, C_1-C_8 dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C_1-C_4 lower alkyl –substituted tetrahydrofuran radical, benzyl radical, [[the]] a $(CH_2CH_2O)_y\ CH_2CH_2OH$ radical where y is a positive integer from 1 to 10, and $-N(R_9)_2$, where the two [[R_9,s]] R_9's which may be the same or different, are either hydrogen or a C_1-C_4 alkyl radical;

$$-\overset{\overset{O}{\|}}{C}-CN;\ -OH;-\overset{\overset{O}{\|}}{C}-R_{10}$$

wherein ~~Wherein~~ R_{10} is a C_1-C_8 alkyl radical, [[;]] phenyl radical, [[;]] tolyl radical, [[;]] pyridine radical, [[;]] pyrrolidone radical; and

$$-\overset{\overset{O}{\|}}{C}-R_{11},$$

~~Where~~ where R_{11} is NH_2, $NHCH_3$, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical.

2. (Currently Amended): A process for preparing a non-viral gene delivery vector formed from an aqueous solution of a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, which comprises reacting a cationic water-soluble linear polysaccharide of the following formula (1)

$$[C_6H_7O_2(OH)_{3-a}(OX)_a]_xH_2O \quad (1)$$

or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)

$$-[CH_2CH(OH)_{1-b}(OX)_b]_n- \quad (2)$$

$$-[CH_2CH(OH)_{1-b-c}(OX)_b(OAc)_c]_n- \quad (3),$$

wherein ~~Wherein~~ X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

$-NH_2$ radical,

$-N(CH_3)_2$ radical,

$-N(C_2H_5)_2$ radical,

$-N^+(C_2H_5)_3$ radical,

$-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2(C_2H_5)N(C_2H_5)_2$ radical,

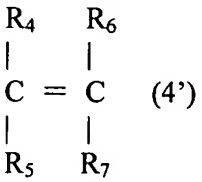
$-C_6H_4NH_2$ radical, [[and]]

$-COC_6H_4NH_2$ radical,

$-COR_2$ radical where R_2 is $-CH_2NH_2$ or $-C_6H_4NH_2$, and

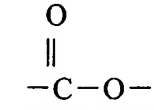
$-CH_2CH(OH)CH_2R_3$ radical where R_3 is $-NH_2$, $-N(CH_3)_2$, $-N(C_2H_5)_2$, [[and]] or $-N^+(C_2H_5)_3$ radical,

where m is a natural number of 1 to 3, a is a positive number having a value of $0<a<3$, b is a positive number having a value of $0<b<1$, x and n are natural numbers having a value of 5 or more, $1>b+c$, and Ac is acetyl radical; with a polymerize-able olefin compound of the formula (4'):



(4')

wherein ~~Wherein~~ R_4, R_5 and R_6 are each selected from the group consisting of hydrogen and CH_3, and R_7 is a member of the group consisting of:



where ~~Where~~ R_8 is a member of the class consisting of hydrogen, C_1-C_{12} alkyl radicals, cyclohexyl radical, C_1-C_4 hydroxyalkyl radicals, C_1-C_8 aminoalkyl radicals, C_1-C_8

dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C_1-C_4 lower alkyl –substituted tetrahydrofuran radical, benzyl radical, [[the]] a $(CH_2CH_2\ O)_y\ CH_2CH_2OH$ radical where y is a positive integer from 1 to 10, and $-N(R_9)_2$ where the two [[R_9,s]] R_9's which may be the same or different, are either hydrogen or a C_1-C_4 alkyl radical;

$$-\overset{\overset{O}{\|}}{C}-CN;\ -OH;-\overset{\overset{O}{\|}}{C}-R_{10},$$

where ~~Where~~ R_{10} is a C_1-C_8 alkyl radical, [[;]] phenyl radical, [[;]] tolyl radical, [[;]] pyridine radical, [[;]] pyrrolidone radical; and

$$-\overset{\overset{O}{\|}}{C}-R_{11},$$

where ~~Where~~ R_{11} is NH_2, $NHCH_3$, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical.

3. (Currently Amended): A complex between a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups and DNA, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)

$$[C_6H_7O_2(OH)_{3-a}(OX)_a]_xH_2O \quad (1)$$

or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)

$$-[CH_2\ CH(OH)_{1-b}\ (OX)_b]_n- \quad (2)$$

$$-[CH_2\ CH(OH)_{1-b-c}\ (OX)_b\ (OAc)_c]_n- \quad (3)$$

wherein ~~Wherein~~ X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

$-NH_3^+$ radical,

$-NH^+ (CH_3)_2$ radical,

$-NH^+ (C_2H_5)_2$ radical,

$-N^+ (C_2H_5)_3$ radical,

$-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2(C_2H_5)N (C_2H_5)_2$ radical,

$-C_6H_4NH_3^+$ radical, [[and]]

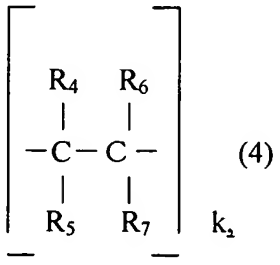
$-COC_6H_4NH_3^+$ radical,

$-COR_2$ radical where R_2 is $-CH_2NH_3^+$ or $-C_6H_4NH_3^+$, and

$-CH_2 CH(OH)CH_2R_3$ radical where R_3 is $-NH_3^+$, $-NH^+ (CH_3)_2$, $-NH^+ (C_2H_5)_2$, [[and]] or $-N^+ (C_2 H_5)_3$ radical,

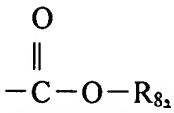
where m is a natural number of 1 to 3, a is a positive number having a value of $0<a<3$, b is a positive number having a value of $0<b<1$, x and n are natural numbers having a value of 5 or more, $1>b+c$, and Ac is acetyl radical;

a unit derived from a polymerize-able olefin compound of the following formula (4)

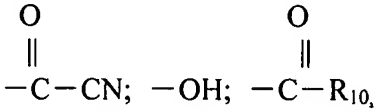


(4)

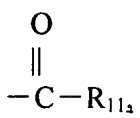
wherein ~~Wherein~~ R_4, R_5 and R_6 are each selected from the group consisting of hydrogen and CH_3 and R_7 is a member of the group consisting of:



where ~~Where~~ R_8 is a member of the class consisting of hydrogen, C_1 $-C_{12}$ alkyl radicals, cyclohexyl radical, C_1-C_4 hydroxyalkyl radicals, C_1-C_8 aminoalkyl radicals, C_1-C_8 dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C_1-C_4 lower alkyl -substituted tetrahydrofuran radical, benzyl radical, [[the]] a $(CH_2CH_2\ O)_y\ CH_2CH_2OH$ radical where y is a positive integer from 1 to 10, and $-N(R_9)_2$ where the two [[R_9,s]] R_9's which may be the same or different, are either hydrogen or a C_1-C_4 alkyl radical;

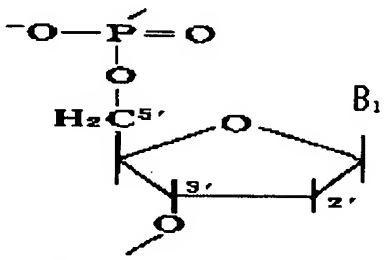


where ~~Where~~ R_{10} is a C_1-C_8 alkyl radical, [[;]] phenyl radical, [[;]] tolyl radical, [[;]] pyridine radical, [[;]] pyrrolidone radical; and



where ~~Where~~ R_{11} is NH_2, $NHCH_3$, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical; and

a unit derived from a poly(deoxyribonucleotide) of the following formula (5) as a recurring unit[[.]] :



(5)

where ~~Where~~ B_1 is a base selected from the group of adenine, thymine, guanine, and cytosine.

4. (Currently Amended): A complex between a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups and RNA, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)

$$[C_6 H_7 O_2 (OH)_{3-a}(OX)_a]_x H_2 O \quad (1)$$

or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)

$$-[CH_2 CH(OH)_{1-b} (OX)_b]_n- \quad (2)$$

$$-[CH_2 CH(OH)_{1-b-c} (OX)_b (OAc)_c]_n- \quad (3)$$

wherein ~~Wherein~~ X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

$-NH_3^+$ radical,

$-NH^+ (CH_3)_2$ radical,

$-NH^+ (C_2H_5)_2$ radical,

$-N^+ (C_2H_5)_3$ radical,

$-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2(C_2H_5)N\ (C_2H_5)_2$ radical,

$-C_6H_4NH_3^+$ radical, [[and]]

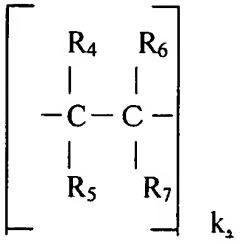
$-COC_6H_4NH_3^+$ radical,

$-COR_2$ radical where R_2 is $-CH_2NH_3^+$ or $-C_6H_4NH_3^+$, and

$-CH_2\,CH(OH)CH_2R_3$ radical where R_3 is $-NH_3^+$, $-NH^+\,(CH_3)_2$, $-NH^+\,(C_2H_5)_2$, [[and]] or $-N^+\,(C_2\,H_5)_3$ radical,

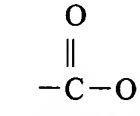
where m is a natural number of 1 to 3, a is a positive number having a value of $0<a<3$, b is a positive number having a value of $0<b<1$, x and n are natural numbers having a value of 5 or more, $1>b+c$, and Ac is acetyl radical;

a unit derived from a polymerize-able olefin compound of the following formula (4)



(4)

wherein ~~Wherein~~ R_4, R_5 and R_6 are each selected from the group consisting of hydrogen and CH_3 and R_7 is a member of the group consisting of:



where ~~Where~~ R_8 is a member of the class consisting of hydrogen, C_1-C_{12} alkyl radicals, cyclohexyl radical, C_1-C_4 hydroxyalkyl radicals, C_1-C_8 aminoalkyl radicals, C_1-C_8

dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C_1-C_4 lower alkyl -substituted tetrahydrofuran radical, benzyl radical, [[the]] a $(CH_2CH_2\ O)_y\ CH_2CH_2OH$ radical where y is a positive integer from 1 to 10, and $-N(R_9)_2$ where the two [[R_9,s]] R_9's which may be the same or different, are either hydrogen or a C_1-C_4 alkyl radical;

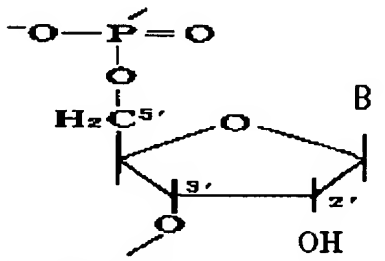
$$-\overset{\overset{O}{\|}}{C}-CN;\quad -OH;\quad -\overset{\overset{O}{\|}}{C}-R_{10},$$

where ~~Where~~ R_{10} is a C_1-C_8 alkyl radical, [[;]] phenyl radical, [[;]] tolyl radical, [[;]] pyridine radical, [[;]] pyrrolidone radical; and

$$-\overset{\overset{O}{\|}}{C}-R_{11}$$

where ~~Where~~ R_{11} is NH_2, $NHCH_3$, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical; and

a unit derived from a poly(ribonucleotide) of the following formula (6) as a recurring unit[[.]]:



(6)

where ~~Where~~ B is a base selected from the group of adenine, uracil, guanine, and cytosine.

5. (Currently Amended): A gene delivery system using [[a]] the complex between the cationic graft-copolymer and DNA [[,]] of Claim 3.

6. (Currently Amended): A gene delivery system using [[a]] the complex between the cationic graft-copolymer and RNA [[,]] of Claim 4.